Module 7 - Strain Gauges

ME3023 - Measurements in Mechanical Systems

Mechanical Engineering

Tennessee Technological University
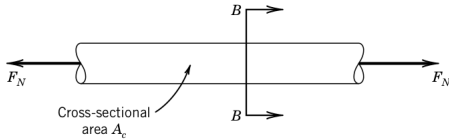
Topic 3 - P3500 Strain Indicator

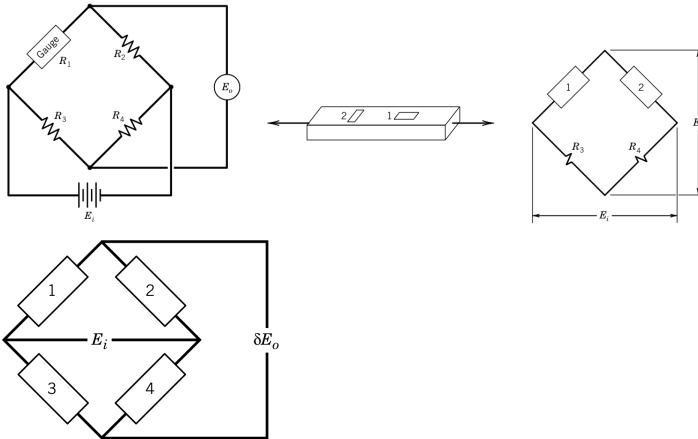## Topic 3 - P3500 Strain Indicator

- Units of Microstrain

- Quarter, Half, and Full Configurations

- Wiring the P3500

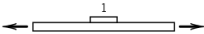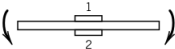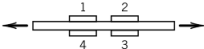- Operating the P3500

- Modern Solution

Units of Microstrain

Cross-sectional area A_c

$\sigma_a = \dfrac{F_N}{A_c}$

Quarter, Half, and Full Configurations

Quarter, Half, and Full Configurations

|	Arrangement	Compensation Provided	Bridge Constant κ
	Single gauge in uniaxial stress	None	κ = 1
	Two gauges sensing equal and opposite strain—typical bending arrangement	Temperature	κ = 2
	Two gauges in uniaxial stress	Bending only	κ = 2
	Four gauges with pairs sensing equal and opposite strains	Temperature and bending	κ = 4
	One axial gauge and one Poisson gauge		κ = 1 + ν
	Four gauges with pairs sensing equal and opposite strains—sensitive to torsion only; typical shaft arrangement.	Temperature and axial	κ = 4
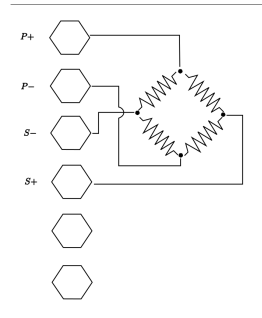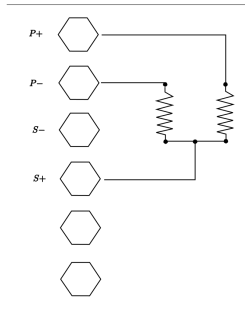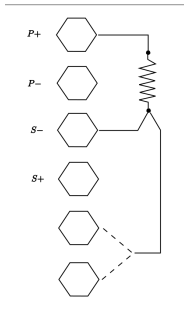
Wiring the P3500

Operating the P3500

- The instructions are on the unit.
- The balancing process is completed after changing any wiring.

Modern Solution

- The P3500 is old technology, but still does not mean it is bad. I have used them myself and they work great.

- The manufacturer *Vishay Group* has a *more* modern solution with DAQ and multiple channels.

- There are a variety of low cost options available but be careful.
  - Sparkfun - strain gauge basics
  - Robot Shop
  - elecrow